

## CLAIMS

What is claimed is:

1. A method for operably applying a phased array antenna system for a mobile platform, the method comprising:
  - 5 disposing a transmit antenna within at least one antenna housing;
  - locating a receive antenna within the at least one antenna housing;
  - converting a receive antenna signal to an aircraft communication frequency signal within the at least one antenna housing;
  - changing the aircraft communication frequency signal into a
- 10 transmit antenna signal within the at least one antenna housing; and
- transmitting the transmit antenna signal from the transmit antenna.
2. The method of Claim 1, further comprising:
  - positioning a converter within each antenna housing;
- 15 connecting an aircraft transfer power with the converter; and
- converting the aircraft transfer power to a phased array antenna power with the converter.
3. The method of Claim 1, further comprising:
  - 20 locating a first frequency converter within the at least one antenna housing; and
  - converting the receive antenna signal to the aircraft communication frequency signal with the first frequency converter.

4. The method of Claim 3, further comprising:
  - positioning a second frequency converter within the at least one antenna housing; and
5. converting the aircraft communication frequency signal to the transmit antenna signal with the second frequency converter.

  

5. The method of Claim 4, further comprising:
  - providing the at least one antenna housing as a receive antenna housing and a transmit antenna housing;
  - locating the first frequency converter within the receive antenna housing; and
  - positioning the second frequency converter within the transmit antenna housing.

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6. The method of Claim 1, further comprising:
  - selecting the receive antenna signal from a frequency ranging from approximately 12 GHz to approximately 20 GHz;
  - operating the aircraft communication frequency signal at a frequency of approximately 1 GHz; and
  - transmitting the transmit antenna signal at a frequency ranging from approximately 14 GHz to approximately 44 GHz.

7. The method of Claim 1, comprising outputting the aircraft communication frequency signal from the at least one antenna housing to the mobile platform.

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8. A method for forming a phased array antenna communication system for external mounting on a mobile platform, the method comprising:  
separably mounting a transmit antenna and a receive antenna to an external surface of the mobile platform;

10 housing the transmit antenna together with a transmit antenna equipment group;

enclosing the receive antenna together with a receive antenna equipment group; and

15 communicating an aircraft communication signal with each equipment group.

9. The method of Claim 8, comprising converting an aircraft service voltage to an antenna power transfer voltage.

20 10. The method of Claim 9, comprising converting the antenna power transfer voltage at each antenna to an antenna operating voltage.

11. The method of claim 10, further comprising converting the antenna operating voltage within each antenna to about 5 volts direct current to operate  
25 each antenna.

12. The method of claim 8, further comprising:  
arranging a first set of phased array antenna elements in a grid  
formation at a transmit antenna upper surface; and  
5 configuring a second set of phased array antenna elements in the  
grid formation at a receive antenna upper surface.

13. The method of claim 8, further comprising:  
electrically connecting each antenna with an aircraft internally  
10 mounted receiver; and  
selecting a frequency of approximately one GHz for the aircraft  
communication signal to decrease a signal attenuation and increase a distance  
range between each antenna and the aircraft internally mounted receiver.

15 14. The method of claim 8, comprising operating the receive antenna to  
receive a plurality of data communication signals between about 12 GHz and  
about 20 GHz.

15. The method of claim 14, comprising operating the transmit antenna  
20 to transmit the data communication signal between about 14 GHz and about 44  
GHz.

16. A method for adapting an aircraft phased array antenna communication system providing antennas and conversion equipment in aircraft mounted structure, the method comprising:

externally mounting at least two antenna discs on an aircraft  
5 fuselage, each disc including one of a transmit antenna and a receive antenna;  
arranging a plurality of phased array antenna elements in both the  
transmit antenna and the receive antenna; and  
converting an aircraft service voltage to a phased array antenna  
operating voltage within each disc.

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17. The method of Claim 16, comprising:  
positioning a power and control equipment group within each disc;  
and  
converting between an aircraft communication signal frequency  
15 using the equipment group and one of a transmit frequency and a receive  
frequency.

18. The method of claim 17, comprising converting the aircraft service  
voltage to an antenna operating voltage of about 5 volts direct current within each  
20 of the two antenna discs.

19. The method of claim 17, comprising:
  - up-converting the aircraft communication signal frequency to the transmit frequency in a transmit antenna disc; and
  - 5 down-converting the receive frequency to the aircraft communication signal frequency in a receive antenna disc.
20. The method of Claim 17, comprising selecting the aircraft communication signal frequency from a frequency ranging between an ultra-high frequency and an L-band frequency.
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21. The method of Claim 17, comprising selecting the aircraft communication signal frequency at about one GHz.
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22. The method of Claim 19, comprising positioning an up-converter within the transmit antenna disc.
23. The method of claim 19, comprising positioning a down-converter within the receive antenna disc.
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24. The method of Claim 16, comprising mounting the antenna discs on an upper surface location of the aircraft fuselage and proximate to a wing leading edge intersection with the aircraft fuselage.